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THE
ONTARIO WATER RESOURCES
COMMISSION
WATER POLLUTION SURVEY
of the
COMMUNITY OF MacTIER
TOWNSHIP OF FREEMAN

1966

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COMMUNITY OF MacTIER - 1966
TOWNSHIP OF FREEMAN

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Report on water pollution
survey of the community of
Mactier in the township of
Freeman, District of Muskoka.

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REPORT

on a

WATER POLLUTION SURVEY

of the

COMMUNITY OF MACTIER

in the

TOWNSHIP OF FREEMAN

District of Muskoka

DIVISION OF SANITARY ENGINEERING

February 1966

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R E P O R T

ONTARIO WATER RESOURCES COMMISSION

INTRODUCTION

The purpose of this survey was to assess the conditions in the vicinity of the community of MacTier with reference to the quality of local watercourses.

Surveys of this type are performed routinely and upon request, and are primarily designed to locate and record any existing sources of pollution. Recommendations are made with respect to pollution abatement and prevention.

When water and pollution control works appear desirable or expansions to present facilities are necessary, the Ontario Water Resources Commission (OWRC) has a programme to aid in the construction and financing of these works. The Commission also sponsors courses for plant operators, to assist them in the operation and maintenance of water pollution control facilities and water works.

GENERAL

The community of MacTier is located on the west shore of Stewart Lake in the Township of Freeman. The Canadian Pacific Railway Company operates marshalling yards at this location. The CPR is the major employer in the community and the estimated population of 800 fluctuates with the work load demand at these marshalling yards.

DRAINAGE

Drainage in the community is effected by two local creeks which flow in an easterly direction and drain to Lake Stewart. Street drainage is discharged to these creeks by street ditches, and storm sewers in the Front Street area. These drainage channels are indicated on the appended maps as Creek A and Creek B.

WATER USAGES

Water Supply

Water for the municipal system, which is operated by the Township of Freeman is obtained from Lake Stewart. Chlorination is provided prior to the water being pumped to the distribution system. This water works supplies the more densely populated areas of the community. There were 209 premises serviced with municipal supply as of August 23, 1965. The southern portion of the community utilizes private wells for water supply.

Recreational

Lake Stewart is used extensively for swimming, boating and water sports.

SOURCES OF POLLUTION

Sanitary Waste Disposal

Sewage disposal generally is by private septic tanks and sub-surface disposal fields. The overburden of rock on some lots and a high water table in other areas presents difficulties in this method of sewage disposal.

In most instances, these disposal units are installed without preliminary approval or final inspection. Individual disposal problems reported in this area have been compounded by the absence of this method of control.

C.P.R. Premises

C.P.R. Boarding House

This residence is located immediately south of Stanley Street. Sanitary wastes are discharged to two 2,600 gallon septic tanks in series. The effluent flows by gravity to a weeping tile field east of the premises. There was no evidence of effluent or surface runoff at the time of inspection.

C.P.R. Family Houses

Three houses are served by a common sewage disposal system which is located near the intersection of Park and Stewart streets. The two compartment septic tank has a reported capacity of 4,200 gallons. The effluent from this unit flows by gravity to a weeping tile field of unknown size. The area allocated for this sewage disposal field appears insufficient to provide an adequate tile bed area.

Evidence of leachate from the disposal field to the Stewart Street ditch was noted by the staff of the Division of Sanitary Engineering on August 25, 1965 and October 14, 1965.

Samples collected from this ditch were submitted for chemical analyses and bacteriological examinations. The results of these analyses are listed below:-

<u>D a t e</u>	<u>Sampling Point No.</u>	<u>5-Day BOD (ppm)</u>	<u>Total (ppm)</u>	<u>Susp. (ppm)</u>	<u>Diss. (ppm)</u>	<u>M.F. Coliform Count per 100ml</u>
Aug.25/65	R1	63	1,048	668	380	2,600,000
Oct.14/65*	<u>M.P.N. Total Coliform Count per 100 c.c.</u>			<u>E. coli per 100 c.c.</u>		
	9,300			430		

* Bacteriological examination performed at the Ontario Department of Health Regional Laboratory at Orillia.

The above laboratory results exceed the OWRC objectives for BOD and suspended solids concentration of 15 ppm. The bacteriological examinations recorded results showing excessive coliform counts.

Refuse Disposal

Garbage and refuse are disposed of by incineration and periodic earth cover at a township disposal site, located on Concession XI Lot 4, approximately three miles east of Highway No. 103.

The lot appears to be sufficiently isolated from any watercourse to disallow pollution.

SURFACE WATER QUALITY

Samples collected from Lake Stewart and from local creeks were submitted for laboratory analyses. The samples taken on October 14, 1965 for bacteriological examination were examined at the Ontario Department of Health Regional Laboratory at Orillia.

Lake Stewart

The laboratory results of samples collected from Lake Stewart are listed below. The appended map indicates the approximate

locations of these sampling points.

<u>Sampling Point No.</u>	<u>D A T E</u>	<u>M.F. Coliforms per 100 ml</u>	<u>M.P.N. Total Coliforms per 100 c.c.</u>	<u>M.P.N. E.coli per 100c.c.</u>	<u>5-Day BOD (ppm)</u>	<u>Suspended Solids (ppm)</u>
LS-1	Aug.25/65	200			0.7	3
	Oct.14/65*		23	0		
LS-2	Aug.25/65	200			0.9	5
	Oct.14/65*		23	0		
LS-3	Aug.25/65	200			0.6	4
	Oct.14/65*		9	0		
LS-4	Aug.25/65	100			0.8	9
	Oct.14/65*		9	0		
LS-5	Aug.25/65	100			0.9	5
	Oct.14/65*		4	0		
LS-6	Aug.25/65	100			0.4	3
	Aug.14/65		15	0		
LS-7	Aug.25/65	200			0.5	4
	Oct.14/65*		43	0	0.4	5
LS-8	Aug. 25/65	200				
	Oct.14/65*		43	0		

*Bacteriological examinations performed at the Ontario Department of Health Regional Laboratory in Orillia.

The samples submitted for bacteriological examination were within the OWRC objectives of not greater than 2400 coliforms per 100 ml or c.c. for waters used for recreational purposes.

The results of the chemical analyses were within Commission objectives for BOD and suspended solids concentration.

LOCAL CREEKS

Creek A

The laboratory results of samples collected from Creek A are listed below. The appended map indicates approximate sampling locations.

<u>D a t e</u>	<u>Sampling Point No.</u>	<u>M.F. Coliforms per 100 ml</u>	<u>MPN Total Coliforms per 100 c.c.</u>	<u>MPN E. coli per 100 c.c.</u>
Aug.25/65	A1	300		
Oct.14/65*			150	23
Aug.25/65	A2	200,000		
Oct.14/65*			1,500	230
Aug.25/65	A3	50,000		
Oct.14/65*			4,300	230
Aug.25/65	A4	10,000		
Oct.14/65*			24,000	230

<u>D a t e</u>	<u>Sampling Point No.</u>	<u>5-Day BOD (ppm)</u>	<u>Suspended Solids (ppm)</u>
Aug.25/65	A1	1.2	37
"	A2	4.6	16
"	A3	2.2	12
"	A4	2.4	6

*Bacteriological examinations performed at the Ontario Department of Health Regional Laboratory at Orillia.

This creek rises in the swampy area east of Mosquito Lake and flows in an easterly direction to Lake Stewart. The laboratory results indicate that contaminating wastes are gaining access to this watercourse. It is significant that samples collected at sampling point A1 which is at a point upstream from where the creek enters the densely populated area revealed satisfactory results. The results of samples submitted for bacteriological examination collected at Points A2, A3 and A4 indicated an abnormal increase in coliforms.

This is indicative of pollution of the watercourse which appears to originate from premises in the general area including Joseph, Centre and North streets, Fern Avenue and Highway No. 612.

Creek B

The laboratory results of samples collected from Creek B are listed below. The appended map indicates the approximate sampling locations.

<u>D A T E</u>	<u>Sampling Point No.</u>	<u>M.F. Coliforms per 100 ml</u>	<u>MPN Total Coliforms per 100 c.c.</u>	<u>MPN E. coli per 100 c.c.</u>	<u>5-Day BOD (ppm)</u>	<u>Suspended Solids (ppm)</u>
Aug. 25/65		400,000			11	38
	B1					
Oct. 14/65*			110,000	24,000		
Aug. 25/65	B2	200,000			5.6	20
Oct. 14/65*			110,000	110,000		
Aug. 25/65						
	B3	800,000			16	74

<u>D A T E</u>	<u>Sampling Point No.</u>	<u>M.F. Coliforms per 100 ml</u>	<u>MPN Total Coliforms per 100 c.c.</u>	<u>MPN E. coli per 100 c.c.</u>	<u>5-Day BOD (ppm)</u>	<u>Suspended Solids (ppm)</u>
Oct.14/65*	B3		110,000	110,000		
Aug.25/65	B4	1,000			1.1	2
Oct.14/65*			110,000	110,000		

* Bacteriological examinations performed at the Ontario Department of Health Regional Laboratory at Orillia.

The preceeding laboratory results are indicative of significant bacteriological and organic pollution. The samples collected from the stream at the catch basins tabulated as B1 and B2 indicated that contaminating wastes from the dwellings and business premises in the Haig, Front and King street areas were being discharged to this creek.

DISCUSSION ON IMPAIRMENT OF LOCAL CREEKS

The laboratory analyses of samples collected from these creeks indicated significant pollution. The creeks enroute to Lake Stewart flow through swampy spring fed areas. The resulting dilution accounts for the absence of any impairment of the water quality in Lake Stewart. However, heavy flows result in increased impairment downstream. A comparison of the results of samples submitted from points A4 and B4 verifies this observation. The samples submitted from these points on October 14, 1965 after a period of heavy rainfall show a significant increase in bacteriological pollution.

It can be concluded that continued pollution of these creeks will result in future deterioration of the water quality in Lake Stewart.

SUMMARY

A water pollution survey of the community of MacTier in the Township of Freeman was made by field staff of the Ontario Water Resources Commission. Field investigations were accomplished during the months of August and October.

It is noted that, in general, the water quality of Lake Stewart was satisfactory. However, creeks flowing through the community receive wastes of a polluting nature. These creeks drain to Lake Stewart. In addition, effluent from the sub-surface sewage disposal field serving the C.P.R. family houses was leaching to the street ditch on Stewart Street. Periods of heavy rainfall flush this leachate to Lake Stewart via a culvert immediately north of the public beach.

The necessity of remedial measures to control these specific pollution problems is a prerequisite to continued satisfactory water quality of Lake Stewart.

RECOMMENDATIONS

1. The Township of Freeman should locate and eliminate all the discharges of polluting wastes to the storm sewers at Haig and Front streets in the Community of MacTier.

2. The owners of malfunctioning septic tank and sub-surface tile field disposal beds in the community of MacTier should contact the Muskoka District Health Unit for advice and assistance and perform the necessary corrective action under the Unit's supervision.

3. The Canadian Pacific Railway Company should take the necessary steps to prevent the discharge of sewage effluent from the tile field serving the C.P.R. family houses, to the Stewart ditch.

4. The Township of Freeman should adopt procedures to ensure that all private sewage disposal systems are approved and installed under the supervision of the Muskoka District Health Unit.

All of which is respectfully submitted,

District Engineer:


C.E. McIntyre, P.Eng.

Approved by:

J.R. Barr, Director
Division of Sanitary Engineering.

A P P E N D I X

EXPLANATION AND SIGNIFICANCE OF LABORATORY ANALYSES

(A) Bacteriological examinations were performed on samples from the watercourse. The Membrane Filter technique or the Most Probable Number method (MPN) was used to determine the presence of coliform organisms. These organisms are normal inhabitants of the intestines of man and other warmblooded animals. They are always present in sewage and are generally minimal in other pollutants. The results of the examinations are reported as M.F. Coliform Count per 100 ml or M.P.N. total coliforms and E. Coli per 100 cubic centimetres.

The Commissions' objective for surface waters in Ontario is a coliform count of not greater than 2,400 organisms per 100 ml or c.c.

(B) Chemical Analysis

The chemical analysis performed on stream and outfall samples included determinations for biochemical oxygen demand, suspended solids and in some instances, turbidity.

(i) Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for stabilization of decomposable organic matter present in sewage, polluted waters, or industrial wastes. The completion of the test requires five days, under the controlled incubation temperature of 20°C. The Commission's

water quality objectives (i) for stream water - a 5-Day BOD of not greater than 4 ppm.

(ii) for storm sewer, water pollution control and industrial waste discharges - a 5-Day BOD of not greater than 15 ppm.

(ii) Solids

The laboratory does tests to determine the total and suspended solids in a sample. The value for dissolved solids is determined by taking the mathematical difference between the total and suspended solids.

The concentration of suspended solids expressed in parts per million (ppm) is generally the most significant of the solids analyses in regard to stream water and outfall discharge qualities.

The OWRC objective for discharge is a suspended solids concentration of not greater than 15 ppm.

(iii) Turbidity

Turbidity is caused by the presence of suspended matter such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water or outfall discharges. It is an expression of the optical property of a sample and the results are reported in "Silica Units".